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FAULTS AND OTHER STRUCTURES IN SOUTHERN ILLINOIS

A COMPILATION

BY

H. B. STONEHOUSE and G. M. WILSON

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ABSTRACT

Faults, folds, dikes, sills, and diatremes mapped in southern Illinois and parts of adjacent states have been compiled on one map.

Knowledge of faults and related structures is important in the exploration and exploitation of coal, oil and gas, fluorspar, and other mineral resources. The mineral resources named all occur in the area covered by this report. The compilation was undertaken to summarize known structural data on one map.

The area shown on the accompanying map includes southern Illinois and adjacent parts of southwestern Indiana, western Kentucky, and eastern Missouri. It is within a major zone of geological deformation extending from northwestern Oklahoma to central Pennsylvania. The faults, folds, and igneous intrusions shown on the map have been compiled from a number of sources (see below). The features were first mapped and are here shown on several horizons, most frequently the bedrock surface, or on No. 5 or No. 6 coal horizons. In this compilation, interpretation of the structure has been confined to joining faults compiled from different sources but in obvious continuity, and to projecting known faults occurring at the edge of a mapped area as short inferred faults beyond that edge. A few additions, corrections, and other extensions of the data are based on more recent field work and drill records.

The map shows two major structural trends. In the eastern and southeastern part of the mapped area, the structural trend is northeastward; in the rest of the area the trend ranges from west to northwest and, rarely, north-northwest. Dikes, which appear to strike northwest-southeast where the strike can be ascertained, are confined to a belt about 15 miles wide, trending NW-SE, and extending from Kentucky into southeastern Illinois.

Most of the faults are steeply dipping normal faults of small displacement, but displacements of from 400 to 2000 feet are known. Many of the faults are complex zones (rather than simple faults), in which there are parallel and cross-cutting fractures. Thrust faults occur in the area, the most prominent being the Shawneetown fault zone in southern Gallatin County and its southwestern extension in Saline and Pope counties, where the known displacement is as much as 3500 feet.

Anticlinal and synclinal folds are commonly associated with the fault systems, in continuity with and en echelon to the faults. Other folds are apparently not related to the faults. Folds are fairly gentle, with dips on the fold limbs generally less than 5° but as high as 20° in the Eagle Valley syncline.

Basic igneous dikes and sills of mica peridotite and lamprophyre are found in the eastern portion of the area. Dikes range in thickness from a few inches to 300 feet; sills up to 75 feet thick are known. Many of the dikes occur in more or less vertical cracks and are not associated with faults. Where they are associated, the faults disturb the dikes and faulting took place, in part at least, after intrusion.

Four diatremes or explosion breccias have been mapped in Hardin and Pope counties. The probable projection of one of these features has been observed in a hole drilled on Hicks Dome in Hardin County, Ill. (Brown, 1954). It is located between 1600 feet and 2944 feet (the bottom of the hole).

All faulting throughout the area is probably post-Pennsylvanian. In the southern part of the area, the faults are covered by Cretaceous strata not known to be faulted.

The cooperation of the mining and oil producing industries of Illinois in supplying data is gratefully acknowledged.

Information for this compilation was obtained from a number of sources, given below.

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